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The Effects of Task Characteristics on Task Planning and Procrastination

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Abstract

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The purpose of this article is to address procrastination from a time planning and time prediction perspective. Three reasons are ascertained as to why people procrastinate, namely unanticipated interruptions, forgetting the task at hand and creating task conflicts during planning. However, since the effects of different types of tasks on procrastination have not yet been addressed, this research aims to fill in the existing gap on this field of study by giving continuation to the research project developed by Fernandes (2013).

Initially, the existing literature on procrastination, propensity to plan and different task types (Number of people involved in the task; Complexity of the task; Consumption Tasks and Attractiveness of the task) is reviewed in order to develop an exploratory and descriptive study on the prevalence of each type of task on the relationships with procrastination. By analysing the effect of the different task characteristics and respondent's proposed scheduled time for their execution, the results show that tasks perform by more than one person (multiple), with certain consumption natures, with a higher level of complexity and that were considered fun were the ones scheduled for the latest slots. The application of a mediation model, allowed us to conclude that task attractiveness and task complexity serve as mediators of the relationship between tasks with consumption nature and time scheduled.

There are several implications for marketers and managers that can be taken out from this study. Firstly it is important to understand such behaviours in the consumption environment in order to develop tools, i.e. customer rewards, to overcome the procrastination and planning problem

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Introduction

Almost every day we see ourselves setting a daily schedule, a weekly schedule and even a monthly schedule, be it deciding what for groceries or when ay you have to go shopping for groceries or when you are going with your car to its biennial check, we allocate and prioritize certain tasks and goals over others. However it is also very common that unpredictable events (usually beyond to our control) happen, which result in some of the planned tasks having to be rescheduled. Meanwhile some of the tasks get delayed, others are postponed or even forgotten. Even if we see that post-it on our desks saying: "Call John to make a dinner reservation" or a pop-up on our desktop saying "Meet with Susanne to discuss the starting date of Project A", it still sometimes happens.

Although it is a behaviour which is mostly studied in the academic universe, more specifically on students procrastination, there has been a recent surge in studies through other perspectives, such as the consumer behaviour, e.g.: Peetz et al. (2010) studied such behaviours with a consumer experiment on Christmas shopping. Many researchers (e.g., Claessens et al. 2007; Bailey & Konstan 2006; Heylighen & Vidal 2007) developed their studies under time management theories and cognitive thinking theories. This research, takes a different approach and aims to address such behaviours under the time planning and time estimation perspectives. On his previous studies Fernandes (2013) addressed the same question through the analysis of the individual propensity to plan and task elaboration.

Furthermore, this research aims to continue the research of Fernandes (2013) by focusing on the different types of task, i.e. to classify task into one of four different categories to check if, in some of those tasks, people are more prone to delay them or accelerate them. No study, as far as we aware, has analysed simultaneously the different types of tasks and what their implications in terms of scheduling and procrastination. In the first stage of this dissertation, a review on the existing literature will be developed and presented to give an overview of the topic in question. This will be succeeded by a presentation of the central question and a breakdown of all its components. Following this, the methodology adopted to describe and determine the nature of the relationship between the three dimensions (different types of tasks, propensity to plan and procrastination) will be presented. Finally results and conclusions will be discussed and presented.

Review of the existing literature and previous research

The past literature defined *procrastination* as the process of delaying tasks even if they mean an unnecessary and unproductive delay (Ariely & Wertenbroch 2002). In the field of economics, procrastination occurs due to preferences and time discounting bias; while the psychological study field suggests there is more behind it such as the miscalculations of future events and time predictions (see literature review on planning fallacy), (Brunnermeier et al. 2013). Additionally, the literature on prospective memory and meta-memory can also be associated with procrastination as explanations to why people forget to pursue certain tasks (Holman & Zaidi 2003) . It is important to study the procrastination behaviours and its causes in order to understand it and provide solutions on how those actions can be avoided.

There are three major explanations for why people fail to complete their plans (Buehler, Griffin, et al. 2010), firstly the unanticipated interruptions that individuals may face while performing a certain task. Another reason is simply because they forget to perform a certain task, even though people might set reminders. Finally, there is also a conflict between plans, which may lead people to set priorities, or disregard some of the tasks.

Planning Fallacy

The planning fallacy was first described by Kahneman & Tversky (1977) as the process whereas people underestimate the time it will take them to complete an upcoming task, being aware that past similar tasks took them longer. First it is important to distinguish the difference between the starting time and the completion time of a task, starting time is when one task is to be started and the completion time is the overall time to complete a task (Buehler, Peetz, et al. 2010). Through this paper it will be presented and discussed to what extend setting a list of priorities influences a task delay or procrastination and by analysing the different effects of task characteristics on prioritization.

For more than three decades researchers, (e.g. Forsyth & Burt 2008; Buehler, Peetz, et al. 2010; Pezzo et al. 2006) have been studying and developing the understandings on the planning fallacy, focusing on possible reasons for the underestimated time predictions. Three major reasons were identified to cause people to optimistically predict completion times. The first one is associated to the fact that people *take an inside perspective* (Kahneman & Tversky 1982), i.e. people tend to focus more on

the task itself, how it is going to be elaborated, its content and obstacles, rather than taking an outside perspective. An outside perspective focuses on how the task fits along with other tasks or how it can incorporate experiences related to similar past tasks. The second is *ignoring past experiences*, since time predictions are a future orientated activity this may lead people to neglect and not consider their past experiences (Buehler, Griffin, et al. 2010). Kahneman & Tversky (1977) argued that when it happens people looking into their past experiences, they most of the times fail to incorporate those experiences, because they regard them as different and useless, making it more difficult to compare with the current or future task. Thirdly, another important contribution to the planning fallacy literature is the consideration that people in their daily lives perform more than one task and pursue multiple goals, thus there is a need to set priorities by scheduling how each goal is going to be achieved and how and when each task is to be started and completed (Claessens et al. 2010).

The planning fallacy is also related to another important term: *task elaboration*, i.e. on how to perform a certain task or activity. Dividing a task into its subcomponents leads to more accurate and less optimistic time predictions (Claessens et al. 2010), mainly because the subtasks act as reminders of the multiple steps needed to be taken in order to complete a task (Kruger & Evans 2004). Suggesting that task complexity has an influence on the planning fallacy effect. They, authors, argued that developing an action plan will encourage individuals to develop strategies to overcome possible obstacles that might arise.

Buehler, Griffin, et al. (2010) further contributed to the understanding of the planning fallacy by studying the behavioural consequences of optimistic predictions on task completion, studying the subject from a cognitive, social, behavioural and motivational perspective. They argued that the motivation, as a desire to finish a task quickly, will lead people to focus mainly on the future (on how to complete the task) and will diminish the attention to possible obstacles, the so called *desirability bias*.

Construal Level Theory

Liberation & Trope (1998 & 2003) developed their studies on the *temporal construal theory*, suggesting that any future event is to be construed according to different levels of abstraction that depend on the temporal distance to the upcoming event. Concrete construals are levels associated to a lower level of time distance, presenting concrete information about the context and features of the future event. On the contrary, the high level construals (greater distance of time) present more simple models based on

the information available at that moment and often schematic and decontextualized (Kanten 2011). Low level construals are related to the "How?" question, addressing the details of certain task, while the high level construals relate to the "Why?" focusing on the aspects of a certain action (Trope & Liberman 2003)

Also more recent studies suggest that the temporal distance to a given event determines how people elaborate their predictions on completion time (Peetz et al. 2010). By studying the concrete level cognitive thinking, they found that people usually focus on two different aspects: step-by-step plans or potential obstacles. While "an increased focus on plans (step-by step) led to earlier predictions" [more optimistic predictions], whereas an increased focus on obstacles led to later predictions." Liberman et al. (2007) investigated on their research the relationship between the levels of construal on implementation intention, suggesting that it involves low level construals that answer to more specific questions such as the "how?", "when?" and "what?" increasing so the likelihood of enacting those intentions and diminishing the temporal distance to its enactment.

Prospective Memory & Metamemory

"Prospective memory [PM] refers to the ability to plan, retain and retrieve an intention as planned" (Walter & Meier 2014) and differs from the retrospective memory that focuses on memory for past events. *Implementation intentions* is a phenomenon well studied by Gollwitzer (1999), describing the elaboration of action plans to pursuit established goals. The relationship between implementation intentions and prospective memory can be described by the effect that the elaboration of concrete action plans have,. As the plans may act as reminders and show commitment to the task, it increases the possibility of the task's completion (Webb & Sheeran 2008). Implementation intentions may also decrease procrastination behaviours by creating a concrete action plan, that reduces underestimation completion times increasing so the probability of completing the task (Rogers et al. 2011).

Metamemory is defined as the "individual's knowledge of and awareness of memory", and is so related to the knowledge, beliefs and feelings about memory (Flavell & Wellman 1975). It plays an important role in the field studies of prospective memory as a predictor of the prospective memory performance (McDonald-miszczak et al. 1999). Wegner (1987) assumes that metamemory is individual dependent, i.e. every person has its own beliefs and knowledge about its memory.

Usually people do not forget the tasks they consider important; however what determines importance is a matter of the individual' judgement, what may seem important to one may not be to another one, limiting so the definition of what is an important task. The importance of a task can be justified by the rewards associated to that task, since they work as tool to increase task importance and task performance. However, when a task is considered to be important more attention resources will be applied to that task (Kliegel et al. 2001), implying that the enhanced prospective memory is at the cost of other ongoing tasks to remember the important ones (Meacham & Singer 1977; Kliegel et al. 2004).

Additionally, (Walter & Meier 2014) claimed, on their review of prospective memory, that receiving the instructions emphasizing the importance of a task will increase the prospective memory on the task. It is to note that the authors differentiated between *rewards* and *relative important instructions* (in relation to other ongoing tasks) that will enhance the prospective memory at the cost of strategic monitoring; while *social motives* and *absolute important instructions* (related to the task itself) will be automatically retrieved. The former, strategic monitoring is related to planning and prioritization of ongoing tasks.

What concerns the retrieval dynamics, i.e. to remember to perform a certain task, in the prospective memory literature; researchers (Kliegel et al. 2001) suggested two types of perspective memories. Those are the event based and time based prospective memory tasks. *Event-based tasks*, the prospective memory task is cued by a specific and external event (e.g., the appearance of a specific colleague or a target word on the computer screen); while for the *time-based tasks*, the action has a specific time to be executed and so has to be self-initiated (e.g., at noon or every 10minutes). It is necessary to consider the different types of prospective memories as they are associated to different memory cues. Knowing the type of prospective memory being used, allows the individual to work on them and enhance its memory.

In this section planning fallacy, construal level theory and prospective memory were briefly discussed in order to frame this research around the central question. Presenting the reader with the main ideas and theories in this study field will allow the understanding of the findings to be discussed in the following sections.

The central proposition, question or problem

The central proposition of the present research is to explore and describe the effects of the different types of tasks along the individual propensity to plan and procrastination. As a first step, a review and discussion on the previous literature will be provided to explore and describe the main ideas and theories of planning and task delaying across the different type of tasks: *consumer tasks, attractiveness of the task, number of people involved in the task* and *complexity of the task*.

Past studies have already presented some research on the above mentioned task characteristics, such as the completion predictions of simple and complex tasks (Buehler, Griffin, et al. 2010), and other researchers compared the time prediction of individuals and groups or task attractiveness. However there is no study, to the date, that aggregates and describes the relationship of all of the three dimensions: propensity to plan, procrastination and task characteristics.

Number of people involved in the task

The first dimension to be analysed concerns the differences between "one" and "multiple" tasks, whereas, "one" tasks are performed by one person with the exception when they mention that a third person is involved (e.g.: studying or studying with my friends). Differently, "multiple" tasks are executed by two or more people; or tasks that need to be executed together with other people, such as partying or cinema. It might not be explicitly that other people are involved; however they only make sense if the task is performed with other people together.

There is a question that needs to be answered which the literature to the date has not yet approached. The question is if group tasks have a motivational effect on the individual to complete the task? Concerning the topic of working groups, their efficiency as a group vs. individuals, the literature presents two different perspectives on the groups' effectiveness on time prediction.

Previous research studied a phenomenon denominated as *the transactive memory system*, first introduced by Wegner (1987), describing a well-known axiom such as "the sum is more than its parts". This assumes memory in between the group to be greater than the account of each individual. The underlying assumption is that by assigning to each individual an expert role in the group, this will facilitated the remembering of specific knowledge and aspects when necessary, since each individual can focus on its expertise field. Along with this reasoning Buehler, Griffin, et al. (2010) suggested that individuals in

a group may adopt an neutral perspective (being an observer), diminishing so the time underestimation. The adoption of an outside perspective allows individuals to focus on the whole environment and context, have a greater overview to plan tasks in a schedule where also other tasks need to be performed, thus come to a more accurate prediction on the completion time (Buehler et al. 2005). Besides, the same authors defend the perspective that working in groups and generating time predictions as a group may accentuate the planning fallacy, an outcome that can be explained by the *group accentuation effect*. This is the same as saying, that working as a group will enhance even more individuals' tendency to adopt an inside perspective overshadowing the outside perspective that could arise from working in a group.

Another contribution relates to deadlines and timelines that a group as to consider. As in every group project or activities, it is necessary to impose and create rules or norms to guarantee coordination among group members. A component of groups' planning is the *temporal awareness norms*, that serve as tool to coordinate and plan the activities that a group has to meet (Janicik & Bartel 2003). Having those norms established within the group, helps individuals to advert for possible unanticipated schedule changes or unpredictable events. Subsequently, those groups will be defined as "high on time awareness" being able to detect future obstacles and so respond to these schedule changes in a more rapid and effective way than groups characterized as lower on those norms.

It is also important to take a look back into the literature of *prospective memory* and motivational theories on social tasks. Previous research (Brandimonte et al. 2010), argue that in tasks or events with a social component, such as "meeting a friend" or "play football", the performance for prospective memory is greater, because those have consequences for other people, so one does not want to fail on them. Individuals avoid to fail at the eyes of others, there is the need to show commitment and to avoid damaging relationships, thus increasing the task importance. Here the sense of "social obligation" (Penningroth et al. 2011) might be an explanation for why social tasks are more remembered. Besides, social tasks can account with the external reminders from others (Penningroth et al. 2011 citing Meacham 1988).

Complexity of the task

In this paper, the task complexity is differentiated and categorized as "simple" and "complex". Simple tasks are the ones that just need one step to be completed, such as reading, study, call someone; while the more complex tasks involve more than one step or imply movement, such as "going to school" that implies leaving home, taking a transport,

et cetera. Past literature on task complexity Wood et al. (1987) suggested a discrepancy among the definition of task complexity, arguing that different studies manipulated differently the task complexity. Two decades later, Liu & Li, (2012) presented us a paper with a review on the existing literature of task complexity and its different viewpoints, dividing the existing definitions from its three viewpoints: structuralist, resource requirement, and interaction (Table 1).

Table 1 - Task Complexity Definitions

Perspective	Definition
Structuralist	Task structure – number of elements of the task and elements interaction in between the task
Resource Requirement	Resources required to complete the task and HIP requirements (information processing)
Interaction	Complexity is a result of the human-task interaction - considers the individual's characteristics which defines what is a complex task from the individual's point of view.

(Adapted from: Liu & Li 2012)

In this paper, the definition of task complexity goes along with the structural perspective, the same adopted by Wood et al. (1987) since it is one of the most used, simple to understand, to apply and easily compared to other literature.

This study aims to describe and understand whereas simple tasks or complex tasks are more prone to be delayed. Is it possible that people tend to delay or optimistically predict the completion time given a difference on the task complexity?

Buehler, Peetz, et al. (2010) showed that when people make more optimistic predictions (underestimation of completion times) it may lead them to finish tasks sooner and that is more likely for simple tasks than complex tasks. It is expected that for complex tasks the completion time is not always achieved because those tasks are more prone to interruption due to its multiple steps and number of subtasks (Buehler, Peetz, et al. 2010). Following that rationale it is predictable that complex tasks will take longer than expected to complete, as interruptions delay task completion time and users to perform slower on those task after interruptions (Bailey & Konstan 2006).

It is also interesting to study task complexity after the first step, in a multiple steps task, is achieved. On the one hand when a task is initiated it might create a motivational effect on the individual to pursue the task until the end without postponing it or delaying it completion, i.e. increasing its commitment to finish the task. It will also work as a reminder to focus on the following sub-tasks needed to finish the whole task. On the other hand there is the *sense of accomplishment* justifying some possible disengagement from the task (Fishbach et al. 2006), i.e. thinking that by starting the task a step was already taken and so it is possible for the individual to delay or postpone the task for later.

Considering now the literature on the temporal distance theory, it helps to answer the question regarding task complexity. Focusing on step-by-step (unpacking the task) planning will also increase the optimism on the completion time (Buehler et al. 2005) on the contrary, if people are instructed to break down the task into sub-tasks (decomposition) and make predictions on each subtask it will most probably diminish the planning fallacy effect, resulting so in more realistic predictions (Kruger & Evans 2004).

Consumption Tasks

In this dimension the distinction is made between "consumer" tasks that involve direct consumption of goods, a purchase, a service or all the tasks that require a specific good such as reading a book. "Non-consumer" tasks are all of the tasks that do not require any good, or service to be completed. The main question that was not yet addressed is if there is any distinction in the propensity to delay consumer or non-consumer tasks.

One can say that people will delay or procrastinate on consumer tasks to avoid spending money, with the prospect in the future to have the money. And according to Chang (2013) people have a greater preference on saving money rather than time. Also people are more prone to evaluate the sunk costs of money than time, leading to an evaluation of the consumption activity, i.e. it is easier to assess the satisfaction on consumption than on non-consumption activities.

However, on the field of propensity to plan, studies that compared the value of time and money today and in the future, suggest a different proposition (Lynch et al. 2010). Firstly it is necessary to distinguish the different characteristics of time and money: the perishability of time, difficulties in assembling time utility, accounting time is not a routine as accounting for money (Soman 2001), to understand the differences in the utility taken from the money or time spent. Furthermore it helps to explain why people perceive to have a greater slack of time in the future than money. Zauberman & Lynch (2005)

suggested that the expected slack of time in the future may induce a greater *delay discounting* in time than in money (when the expected time slack grows faster than the money slack). In situations involving spending time rather than spending money, people are prone to make decisions based on quick and easy heuristics, entailing a stronger compromise effect (Monga & Saini 2008). Following this rationale we may argue that people will be more prone to delay tasks that involve non-consumption assuming that it will take them more time than the consumption tasks.

Attractiveness of the task

The attractiveness of a task can be distinguished between the tasks that are "tiring" from the ones that provide joy. The tasks considered "fun" are tasks that are recreational, hedonic, relaxing and do not present any (or low) responsibilities in comparison with the "tiring" tasks that require attention, concentration, effort and are considered boring.

What concerns task attractiveness, it is expected that tasks that are more attractive or provide more joy to the individual will be less delayed, because there is an intrinsic motivation which makes individuals most likely to perform the task when compared to the tasks that seem more difficult, costly or show low benefits in the short term to the individual (Ryan & Deci 2000). "Procrastination was greater on tasks regarded as unpleasant or as impositions, and to a lesser extent on tasks requiring skills the respondent did not believe he or she possessed" (Milgram et al. 1988).

The *present-biased preferences* (same rational as the hyperbolic delay indicating time inconsistencies) may also be used to explain this behaviour, since an individual weight more the current well-being (e.g. performing a fun task) over a later moment (e.g. satisfaction of finishing a tiring task) (O'Donoghue & Rabin 1999) or simply valuing more the present moment even if in the future this will be regretted.

Also in a study developed with children regarding task attractiveness, Somerville et al. (1983) suggested more attractive tasks were the ones most remembered when compared to an unattractive task, proposing that the task attractiveness increases its importance and so will be more easily remembered. Later, Kliegel et al. (2004) confirmed that the perceived importance of a task influences its prospective memory.

According to the *self-control* theory (McCrea et al. 2008), it is expected that people with a high level of self-control will overcome a temptation in order to fil an obligation or high end-goal. Likewise, an individual with a low self-control level will fail on overcoming the temptation, ending up performing the pleasant and amusement tasks before the tasks

that imply meeting obligations and responsibilities. Given this, it is expected that the delay of tasks will depend also on the self-control of the individual.

Importantly to refer is the behaviour that one adopts when faced with deadlines. Our everyday life is full of deadlines, e.g. either in the work place to meet the project deadline or as a consumer to redeem a coupon. However it is also common that we are delayed to meet the deadline or we end up forgetting to redeem the supermarket coupon. (McCrea et al. 2008) studied procrastination on tasks that implied to meet certain deadlines, namely by addressing the question why people usually leave a great amount of workload to the last minute? To answer it they addressed this question through the construal level theory, assuming that only when the deadline comes closer, people start to think in concrete levels on how to perform the task and thus coming closer to deadlines might be a reason why sometimes people put some tiring tasks before the pleasant ones.

Loewenstein (1987) studied the anticipation and valuation of delayed consumption, i.e. why people prefer to delay certain tasks or why sometimes people accelerate the preference of undesirable activities. In the model presented the delay of desired consumption is explained by two different effects. First, people may wish to delay a pleasant task so that they have time to plan and so increase the utility derived from that activity (one of the examples used was to "get a kiss from a movie star to the choice of the individual" or why people may wish to "save a bottle of good champagne for a later event"?). The second possible explanation is related to the scarcity effect. This suggests that people may wish to save the task/activity/consumption to the future because in the future it is less probable that the good will be available (e.g.: eat raspberries in the winter time). In a more recent study, Shu & Gneezy (2010) added (in their short vs. long term procrastination studies) why people procrastinate on pleasant tasks. The given explanation takes a step further and relates to the time prediction and perceived slack of time (as described in the CLT); saying that people may not engage in tasks that present immediate benefits because they believe to have more time (a greater slack) in the future to enjoy them.

Additionally, Claessens et al. (2010) approached the question from the task importance perspective. Their studies suggested that task attractiveness was not correlated to task completion, weather "tasks that are both important and urgent are more likely to be performed, but tasks that are only important and not urgent are unlikely to be complete." The main point is the prevalence of task importance and urgency over task attractiveness.

Table 2 summarizes the literature presented and reviewed in this paper regarding the different approaches on task attractiveness and task delay or procrastination. Previous researchers added valuable insights and contributed to the development of the understanding of the relationship between task completion and task attractiveness. However, in some of cases the different point of views and theories seem to be contradictory, such as the use of similar arguments to describe opposite behaviours. It was important in a first instance to recognize the different perspectives on the literature in order to discuss the results gathered at the data analysis.

Table 2 - Literature on "Task Attractiveness"

Theory	Author	Proposition	Effects on Delay and Procrastination
Self-Determination Theory	Ryan & Deci (2000)	Intrinsic motivation leads individuals to perform tasks that provides enjoyable and interesting experiences	Procrastination on the unpleasant tasks
Present-biased preferences	O'Donoghue & Rabin (1999)	When considering trade-offs between two future moments, present-biased preferences give stronger relative weight to the earlier moment as it gets closer	Having preferences for tasks that bring immediate benefits will lead the individual to perform the fun tasks before the tiring ones
Rewards; Task Attractiveness; Task Importance	Meacham & Singer (1977) Somerville et al. (1983)	Rewards increase task importance to the individual. Tasks considered attractive will be more easily reminded due to a greater perceived importance	Pleasant tasks will more easily remembered then unpleasant ones
Self-Control	McCrea et al. (2008)	Relationship between self-control and propensity to plan as a predictor of task prioritization	Task delays depend on the individual propensity to plan level
Reverse time inconsistency and present bias	Shu & Gneezy (2010) Loewenstein (1987)	People will have a greater time slack in the future to enjoy more pleasant tasks	Procrastination on pleasant tasks
Task importance	Claessens et al. (2010)	Task attractiveness and task importance are not related	Fun tasks do not have to be prioritized over unpleasant ones, but over important ones.

The review on the existing literature about the different types of tasks is very extensive, and in some cases even contradictory. (I) For tasks comparing working groups with individuals it is suggested that the task with a social component will be scheduled earlier, given it commitment made by the individual towards others. However, the literature on working groups evidences the effects of group norms and the importance of group's organization as essential to a successful task completion. (II) Regarding the task complexity, past studies show more agreement on the prediction that complex tasks are more prone to be delayed and scheduled later given its complex nature. (III) For the consumption tasks, the hypothesis made is that non-consumer tasks will be more delayed than consumption task given the delay discounting for time being greater than for money. (IV) Finally, in the task attractiveness field the discussion among researcher is wide, with different results being presented and different explanations being plausible, given this it was not possible to claim any conclusions or draw hypothesis. It was just possible to present the different results and keep them in mind when conducting the statistical analysis.

Methodology

The present research as an extension of Fernandes (2013) study needed to follow a similar research methodology to ensure consistency among the two studies and to allow comparison without incurring in mistakes. Given this, the same data set was applied to study the different variables.

Methods and Procedures

As mentioned before, this study is an extension of the research developed by Fernandes (2013). In his dissertation, Fernandes (2013) collected five studies in which he asked participants in the lab to list 10 tasks they intended to perform over the following week(s). Two additional studies were collected in 2014 with a similar procedure in order to address reviewers' concerns of a paper Professor Fernandes is working on based on his doctoral dissertation (Fernandes & Lynch 2013). Thus, in total seven studies (including 1298 respondents) were used to test the hypotheses of the present thesis In all studies participants were asked to specify ten tasks they wanted to perform in the next week(s). It was also demanded to participants the scheduling of those tasks, i.e. when they intended to perform those tasks. As a result, the dataset used in this thesis includes 12980 observations.

The seven studies were then codified according to the different task types: (I) one vs. multiple; (II) simple vs. complex; (III) consumer vs. non-consumer and (IV) fun vs. tiring tasks. Every data set was coded twice by different codes. Four coders blinded to the hypotheses were initially trained and then coded each task in terms of the four different dimensions. Three coders were paid to codify, one was the first author of this thesis. Afterwards the Kappa coefficient was used to evaluate the agreement on the coding between both coders. The usage of the Kappa coefficient, to access the reliability of the coding agreement, is a better option than the simple calculation of the percentage of agreement, because the simple one that does not account the cases that could happen by chance (Di Eugenio 2000). The Kappa coefficient can be calculated by following the formula:

$$K = \frac{P(A) - P(E)}{1 - P(E)}$$

Whereas P(A) is the observed agreement and P(E) is the expected agreement, i.e. agreements that are expected to occur by chance and is calculated by computing expected frequencies for Pearson's X^2 but only for the agreed items.

To evaluate the strength of the agreement between the two coders it was used the measures presented by Koch & Landis (1977), see Table 3. The results comparing both groups of coders are the following for each task type:

Table 3 - Kappa Coefficients

Task Characteristic	Kappa coefficient	Strength of Agreement
Number of people involved	0.844	Almost Perfect
Consumption Tasks	0.714	Substantial
Task complexity	0.708	Substantial
Task attractiveness	0.725	Substantial

(Adapted from: Koch & Landis 1977)

For the category that accounts the number of people involved in the task, it was the one with higher level of agreement, however overall the results are quite satisfactory and acceptable to proceed with the analysis of the data. Thus after solving the few disagreements among the coders, data analysis was conducted to test the hypotheses. The following data analysis adopted an exploratory form and from those findings develops some hypothesis to be tested, but it is mainly an exploratory analysis to confirm the above discussed literature and questions. For the data analysis the SPSS program was used to calculate relevant statistics and test some hypothesis, the relevant outputs can be found in the Appendix 1.

Reliability and Validity

Regarding the validity and generalization of a research and its results, it is necessary to ask ourselves to what extent a certain study is valid or to what extend is applicable to the population. Research bias occurs at different stages such as literature review, data collection, data analysis or even writing conclusion (Pannucci & Wilkins 2010).

To overcome those biases, some actions and procedures were considered. . Before the analysis, the results were checked for possible missing cases and during analysis, it was tried to overcome the biasing problem, by letting more than one person code the data. This allowed comparing the results and so ensuring a more consistent result to conduct the analysis.

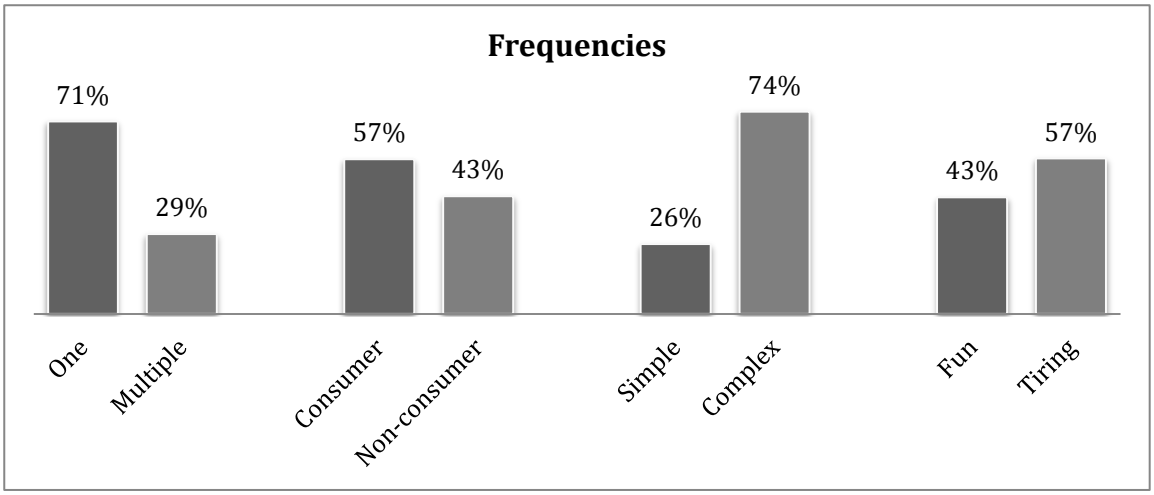
As in any study or research with the aim to explain human behaviours, the researcher has to keep in mind the ultimate goal of the research and be aware of the reality that surrounds him. Multiple interpretations can be made for the same effect or event, e.g. during the literature review, I will discuss and present it from my perspective. Thus the researcher has to present and develop its studies in the most objectively way possible. Nevertheless, the researcher has to be conscious of the subjectivity that is subject to, e.g. a researcher can decide for a quantitative research to be the most objectively possible; however there will be always a stance where the researcher is asked to make a decision or an evaluation. It is not possible to represent the truth perfectly neither describe the reality we live in through models; being aware of such constraints is essential. This study attempts an objective and unbiased representation of the human behaviour, by being aware of all the above mentions circumstances.

The decision to take a quantitative or a qualitative approach or between field or laboratory studies depends on the ultimate goal of the research study. The researcher has to evaluate the different alternatives to choose the best procedure to answer to the research questions. In our case, the quantitative approach allowed a greater collection of observations in a shorter period of time as well as a better way to compare the observations. As the purpose to confirm and describe causal-effect relationships, a quantitative approached is also suggested to be a good option (Malhotra 2010). The initial collection of secondary data (literature review) is considerably important for us, it gives us an overview of what was already studied, in order to develop better the problem, develop our research approach and research hypothesis. Nevertheless it is important, while collecting secondary data, to be conscious and critical about all the information, by assessing its validity (methods used, objectives and data collected, time of the study) in order to evaluate its relevance for our study. Working with quantitative data also allows a better exploration of the different dynamics, relationships and associations between the variables, which would be more challenging with qualitative data.

Data analysis

From the 12980 observations (total number of tasks scheduled by participants), 112 were considered invalid, so they needed to be dropped out to further conduct the statistical analysis. To begin with and to have an overview of the data collected, a frequency distribution of the different type of tasks was calculated (Graph 1).

Graph 1 Frequency Distribution



This allows presuming that most of the tasks to be performed are mostly individual tasks (71%). Also about 74% of the tasks that we face in our daily lives are complex tasks. But when comparing the number of consumer and task attractiveness, one may say they are almost equally distributed (43% vs. 57%).

Effect of task characteristic on time prediction

The dependent variable on the following studies is the time (in days) to which respondents scheduled their tasks from the day they did the experiment. To determine whether different type of tasks result in different planning patterns one-way ANOVA were used to compare the variances.

For the *number of people* involved in the task performance, people scheduled the multiple tasks for later. On average the "one" tasks were scheduled for 4.63 days while the multiple in 5.01 days, the difference might not be big, but it is significant ($F(1, 12866) = 23.992$, $p<0.001$). The outcome from this statistical analysis suggests a different outcome than the one investigated and proposed in the literature review, that group tasks would be less delayed due to a social obligation effect and the motivation to comply with one's

commitments. But the obtained results show that the respondents scheduled the individual tasks earlier than the multiple tasks. One possible explanation for this behaviour could be that people try to finish the tasks that depend on their own first in order to have more free time in the future for the ones that involve more groups. Additionally, it might also be difficult to match schedules between people in the short term, so those tasks are left for later.

Regarding the *task complexity*, results show that individuals scheduled more complex tasks for later ($F(1, 12866) = 128.222$, $p<0.001$) with a difference from M= 4.07 to M= 4.98. The delay of the more complex tasks goes along with the propositions made by past researchers (Buehler et al. 2005; Buehler, Peetz, et al. 2010; Bailey & Konstan 2006), that complex tasks are delayed for different reasons: multiple sub-tasks which requests more attention and resources to be allocated (Kruger & Evans 2004), this suggest that complex tasks are more difficult and take longer than the simple tasks. Additionally, these are more prone to interruptions and the individual knows it will take it longer.

In what concerns to the *consumption tasks*, there is also a propensity to schedule those tasks that involve consumption to later than the non-consumer tasks (M=4.91 and M=4.52 respectively) being the difference significant ($F(1, 12866) = 29.924$, $p<0.001$). These results confirm Chang's (2013) assumption that people have a greater preference on saving time than money than time, however they show a different proposition from the delay discount theory. For instances, when looking into the difference between the means, this is not big.

Finally, the ANOVA test also show us that in terms of *task attractiveness*, tiring tasks (M=4.44 days) are scheduled earlier than fun tasks (M=5.14 days) ($F(1, 12866) = 98.002$, $p<0.001$). As mentioned before, the literature on task attractiveness is very complex and suggestive, there is no clear proposition whereas fun tasks are more prone to be delayed or not. Our results suggest that individuals delay their fun tasks for later, this may have possible explanations behind it, one is the self-control effect (McCrea et al. 2008) along with a high propensity to plan that leads individuals to accomplish with their obligations first and afterwards the pleasant tasks. Another proposition is that in the future people have more time to enjoy these activities (Shu & Gneezy 2010) and so they will perform first the tiring tasks to have more time in the future for the pleasant ones.

In summary, the results from the ANOVA suggest that there is tendency for individuals to schedule complex, multiple, fun, and consumer tasks later. However, to

better understand and explain those results a second analysis on the effect of the different task characteristics is performed.

Relationship between the different types of task

In order to better understand the dimensions and relationship among the different task characteristics, crosstabs were calculated to all the combinations. In all the cases, the calculated p-value was below 0.01, showing evidence of a relationship between the two variables being analysed (Table 4).

Table 4 - Cross tabulations

		Number of people		Consumption Tasks		Task complexity		Task attractiveness	
		One	Multiple	Consumer	Non-consumer	Simple	Complex	Fun	Tiring
Number people	One			64,2%	79,2%	81,5%	66,9%	47,8%	87,8%
	Multiple			35,8%	20,8%	18,5%	33,1%	52,2%	12,2%
Consumption Tasks	Consumer	51,6%	69,3%			33,0%	65,0%	81,7%	38,0%
	Non-Consumer	48,4%	30,7%			67,0%	35,0%	18,3%	62,0%
Task complexity	Simple	29,7%	16,2%	15,0%	39,8%			20,9%	29,4%
	Complex	70,3%	83,8%	85,0%	60,2%			79,1%	70,6%
Task attractiveness	Fun	29,0%	76,3%	61,7%	18,1%	34,8%	45,7%		
	Tiring	71,0%	23,7%	38,3%	81,9%	65,2%	54,3%		

Note: This table was computed based on crosstabs for each individual combination of every two tasks

However, it is not enough to proof an association, it is also necessary to evaluate the degree and strength of the association between the two variables. The Phi and Cramer's V values (Appendix 2 - Table 5) are the statistics used to evaluate it and according to (Cohen 1988) (Appendix 3 -Table 6) values close to 0.3 are already acceptable and show a moderate level of association. Most of the results present a negative Phi, however this is due to codification entries, with no implication for the validity of the statistic calculated (Jurgensen 1947). The results suggest that consumption tasks are more likely to be fun and complex, since 81.7% (Phi = 0.44) of the consumer tasks are fun. This can be explained by the fact that most of our consumption activities, besides shopping or other monetary obligations, are mostly pleasant tasks, such as reading a book, travelling, going to cinema, et cetera. And looking back to the results from the ANOVA analysis, both consumer and fun task were schedule for later. This relationship of interaction will be further tested, on how they interact to predict the scheduling time to be completed.

Likewise, about 65% (Phi= -0.28) of the consumption tasks are complex, suggesting a mediation effect of the complex task on the time scheduling of the tasks.

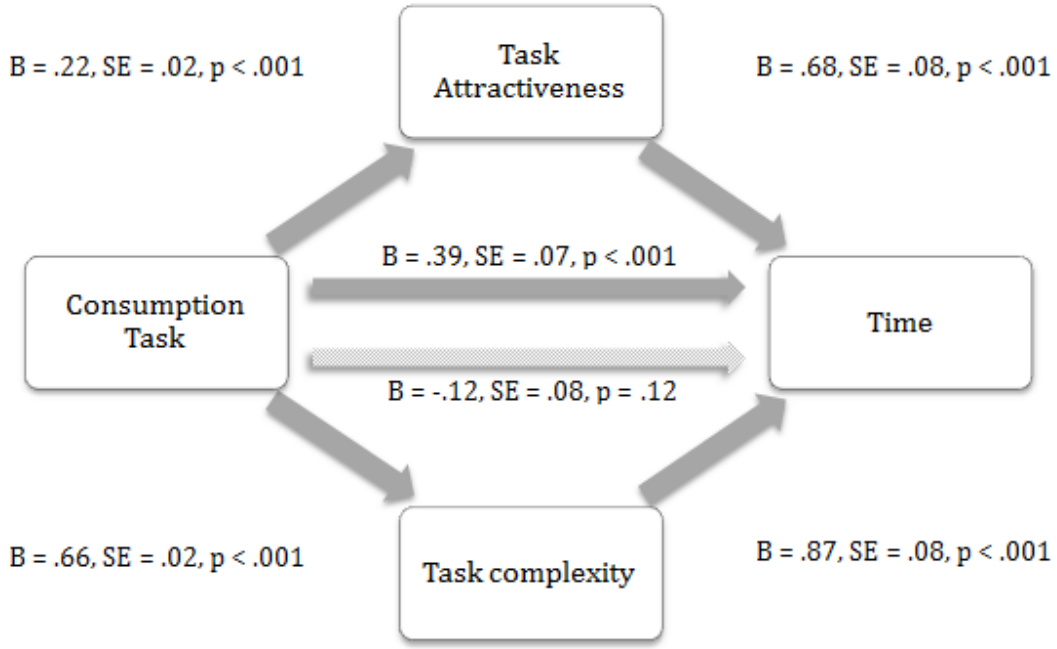
Model

From this standpoint another hypothesis was tested: (H_A) Consumer tasks are scheduled later because they are more fun and more complex. To study this effect, a mediation model with these variables was created.

Firstly, the correlations among the variables were calculated in order to later determine the SOBEL statistic. The SOBEL determines the strength of the indirect effect of the independent variable on the dependent one. The Figure 1 depicts the model as it shows the influences that the consumer task has on time through the mediation of task attractiveness and task complexity To calculate the mediation of these variables, the (Baron & Kenny 1986) mediation analysis was conducted. . There are three conditions that need to be satisfied to show evidence of the mediation effect. (i) The association between consumption task (independent variable) and time (dependent variable) must be relevant. (ii) The independent variables must also show association with the mediators (task attractiveness and task complexity and (iii) the regression of the dependent variable on the independent variable and mediators must be statistically significant (Baron & Kenny 1986).

The results of those regressions can be seen in each of the relationships depicted in the model (A, B, C and D. The connection of E and F shows the effect of task consumption type on time with and without mediation effect (respectively). According to the Baron and Kenny mediation model it is also expected that the consumption effect is not significant when the variables of task attractiveness and task complexity are included in the model, because this shows that the consumption effect is explained by the other two variables in the model. The mediation test shows that when the categories: consumer, complex and fun are included in the model it is possible to describe an interaction effect on predicting time.

Figure 1 Mediation Analysis Model



Nevertheless, it is also necessary to analyse the strength of these indirect effects, for this the SOBEL test was calculated. The results show that for task attractiveness is statistically significant mediator (SOBEL test: = 6.73, $p < .001$). Results on the SOBEL test for the task complexity show that the association between consumer tasks and time is mediated by task complexity (SOBEL= 10.33, $p < .001$). Both cases serve as explanation to the direct relationship of consumption tasks on time, as it helps to understand that relationship. In our case it is important to find out why, when and how the consumption task will be delayed, and this model helps to understand that it depends on other characteristics of the task. Considering the hypothesis of Task A coded as *consumer* and *fun*, it is expected that it will be delayed, not only because it is consumer task but also because it is also a fun task; meanwhile we have Task B coded as *consumer* and tiring, the arising question is whether the task is going to be scheduled later (due to the consumer characteristic) or it is going to be scheduled earlier (because it is a tiring task)? What the developed mediation model suggests is that the consumption tasks effect on time will be influenced by the mediation variable, so in our example it will be scheduled earlier.

Conclusions

It happens in our everyday life day that we face the need to schedule different types of tasks in our agenda such as buying groceries, attend parents meeting, schedule the doctor appointment, et cetera. The studies on procrastination, planning and time management literature already discussed possible explanations for those behaviours. However, none of them addressed the question from a task characteristic perspective. There is a lack on field of study concerning the influences of the different types of tasks on planning and procrastination. Given this, this study to explored and described the effects of task type on procrastination.

Main findings

From the discussion of existing literature on the different types of tasks, it was not only possible to predict neither it was not always clear how the different types of tasks influence the task planning. The literature comparing *individual and groups* task estimation is vast, suggesting that groups, as individuals, may also be classified in high and low propensity to plan. However, our study focused on the individual time prediction and the results showed that people are more prone to schedule later the group tasks rather than the individual ones. This could be explained by the independence on others that individual tasks present to be schedule and be performed. Individuals face a greater flexibility to schedule individual tasks rather group tasks which allows them to schedule the "one" tasks earlier. From the *task complexity* analysis it was already expected that more complex tasks would be scheduled for later. Since complex tasks involve multiple subtasks, it is proposed that they are more difficult and take longer, leading people to schedule them for later. The *consumption* tasks were also scheduled for later, which goes against the conclusions taken from the literature review. However these results support the argumentation that people prefer to save money over time. Finally, regarding *task attractiveness*, the literature is very suggestive and it was not possible to make any conclusions, but the results from the analysis suggest that people delay fun tasks in the perspective to have more time in the future to enjoy them. The final analysis was the development of a mediation model to study the effect of consumption tasks on time scheduling mediated by the variables of task complexity and task attractiveness.

Managerial Implications

Customer procrastination is an important topic in the field study of consumer behaviour. It is important for companies to understand why consumers behave in certain

ways, and in this case, what leads consumers forgetting to buy certain things. And what can companies develop to overcome this problem? Understanding reasons, situations and the environment behind procrastination behaviours allows companies to react in the more efficient way, such as developing reminders and cues for customers (Fernandes 2013).

Or if we consider consumer rewards, in previous literature it has been shown that consumers often prefer a coupon to redeem in a couple of weeks than in the next days (Webb & Sheeran 2008). Such behaviours are important to understand in order to offer a the customer a better service and simultaneously increase customer retention. If company managers are able to understand such behaviours it might also turns to be easier finding a solution for these cases. The previous research (Fernandes 2013) addressed this issue by studying the functions of reminders, and this paper aims to help by providing a basis to expand the studies of reminders across different types of tasks. Through the manipulation of certain tools, it is possible for companies to create reminders and cues for its customers to avoid their procrastination.

Limitations

One of the limitations encountered is also faced by many researches, namely approaching the research through a quantitative or qualitative data collection process. In this study it was essential to collect secondary data. Initially it was necessary to understand the new variables in order to develop the research questions and hypothesis that would be tested in the data analysis part. One of the main difficulties encountered to describe the different types of task characteristics was the lack of literature, e.g. in delayed consumption or the shortness of the literature addressing one and multiple goals pursuit (Dalton & Spiller 2012). This created some challenges to aggregate all the information and develop possible hypothesis. However if in some cases the literature was lacking on new studies and developments on other fields it was overwhelming with information, such as it was the case of the task complexity or task attractiveness, whereas the literature is extended, sometimes contradictory and it gets difficult to compare and analyse all of it. The usage of comparative tables simplifies all the process, besides it also helps future researches by having an overview on the existing literature.

The data analysis followed a quantitative approach to take advantage of the number of observations that could be analysed (in a qualitative analysis it would increase the difficulty to incorporate a great number of observations). It also allowed the description and association of causal effects among the variables to be studied, such as the incorporation of the mediation model. Besides, given the nature of the research,

continuation of a previous study, it was necessary to keep consistency among the studies, so was necessary to take a (very) similar approach to analyse and compare the data collected.

Another important aspect that needs consideration is the use of the SOBEL test in the mediation model. The SOBEL test has been subject to various critiques in the recent years, mainly because it makes the assumption about the distribution of the product term (AB – unstandardized coefficients of the two regressions), saying it follows a normal distribution. The alternative approach, Bootstrapping, doesn't make such assumptions, however it was not possible to use that test, because our variable are dichotomous and that approach is still in development to be used with dichotomous variables.

Future Research

This study took the first step of exploring and describing the different types of tasks and its effects on task scheduling. This allows further investigation on these variables according to success in task completion or as mentioned above, according to effects of reminders across the different tasks. Besides, task completion failure is also a subject to be considered in the future and the different effects of task characteristics on the unsuccessfully task completion. Also, future research could focus on the effects that failures have on the task completion, i.e. after failing or forgetting to perform a certain task what is the effect on prospective memory?

Future research could also address the same research question under the perspective of groups instead of individuals. Namely are groups more prone to delay certain type of tasks? This is an important subject to companies more at an internal level, such as organizational behaviour, however it can also be applied to consumers under the topic of group consumption.

It might be useful and interesting to study these variables according to age groups, as the literature in ageing memory is wide (Aberle et al. 2010) , across different gender or cultures. Past studies do not focus on the procrastination across different cultures. Thus, an extended research on procrastination mediated by different demographics helps companies to predict and develop promotional campaigns.

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Appendices

Appendix 1 - Effect of task characteristic on time prediction

1.1. Number of people involved in the task

Descriptives

time

	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		
"one"	9096	4,63	3,979	,042	4,55	4,71	0	60
"multiple"	3772	5,01	4,014	,065	4,88	5,14	0	25
Total	12868	4,74	3,993	,035	4,67	4,81	0	60

ANOVA

time

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	381,807	1	381,807	23,992	,000
Within Groups	204744,285	12866	15,914		
Total	205126,092	12867			

1.2. Complexity of the task

Descriptives

time

	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		
"simple"	3308	4,07	3,683	,064	3,94	4,19	0	19
"complex"	9560	4,98	4,069	,042	4,89	5,06	0	60
Total	12868	4,74	3,993	,035	4,67	4,81	0	60

ANOVA

Time

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2024,107	1	2024,107	128,222	,000
Within Groups	203101,985	12866	15,786		
Total	205126,092	12867			

1.3. Consumption Tasks

Descriptives

Time

	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		
"consumer"	7307	4,91	4,044	,047	4,82	5,00	0	60
"non-consumer"	5561	4,52	3,914	,052	4,42	4,63	0	20
Total	12868	4,74	3,993	,035	4,67	4,81	0	60

ANOVA

time

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	475,986	1	475,986	29,924	,000
Within Groups	204650,106	12866	15,906		
Total	205126,092	12867			

1.4. Task Attractiveness

Descriptives

Time

	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		
"fun"	5517	5,14	4,309	,058	5,03	5,26	0	60
"tiring"	7351	4,44	3,710	,043	4,36	4,53	0	25
Total	12868	4,74	3,993	,035	4,67	4,81	0	60

ANOVA

time

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1550,668	1	1550,668	98,002	,000
Within Groups	203575,424	12866	15,823		
Total	205126,092	12867			

Appendix 2 – Validation statistics

Table 5 - Phi and Cramer's values for the crosstabs

		Number of people		Consumption Tasks		Task complexity		Task attractiveness	
		One	Multiple	Consumer	Non-consumer	Simple	Complex	Fun	Tiring
Number people	One Multiple			0,163*		0,140		0,435*	
Consumption Tasks	Consumer Non-Consumer	0,163*				0,282*		0,436	
Task complexity	Simple Complex	0,140		0,282*				0,096	
Task attractiveness	Fun Tiring	0,435*		0,436		0,096*			

Note: This table was computed based on crosstabs for each individual combination of every two tasks. All the values for Phi and Cramer are the same only for those marked with "*" the Phi was negative.

Appendix 3 – Magnitude of Effect Size

Magnitude of Effect Size	Cramer's V/phi	Cohen's d
Small	0.1	0.2
Medium	0.3	0.5
Large	0.5	0.8

(Cohen 1988)

Appendix 4 – Kappa Statistic

Table 6 - Agreement measures for categorical data

Kappa Statistic	Strength of Agreement
<0.00	Poor
0.00 – 0.20	Slight
0.21-0.40	Fair
0.41-0.6	Moderate
0.61-0.8	Substantial
0.81-1.00	Almost Perfect

(Koch & Landis 1977)

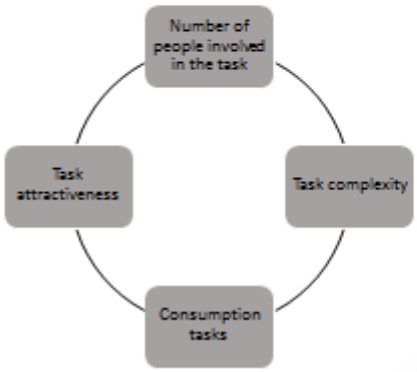
Appendix 5 – Slides for future employers

Research Question

Extension of Prof. Daniel Fernandes's research project

- *Research proposal*: Determine the effects of different types of tasks on procrastination – Which tasks are more prone to be delayed?

- Exploratory and Descriptive Study



Main findings

- Tasks that involve more than one people (**multiple** tasks)
- Tasks with a **consumption** nature
- **Complex** tasks involving multiple steps
- **Fun** and pleasant tasks

More prone to be delayed and so procrastinated

Managerial Implications

Contribution and Relevance of the study:

- Consumer **procrastination** – understand on which tasks customers are more prone to procrastinate → Help to focus on a **case - specific solution** if we understand better the causes of such behaviours
- Marketing
  - Customer behaviours on coupon redemptions
  - Shopping list
  - Reminders

→ some of the examples of marketing tools that can be managed to overcome some of the issues related to customer procrastination

Individual Reflection

- Time management
- Experience to be part of a research project
- Summarizing skills
  - Critical thinking
  - Assessing relevance and validity
- Structuring and Planning
- Time management